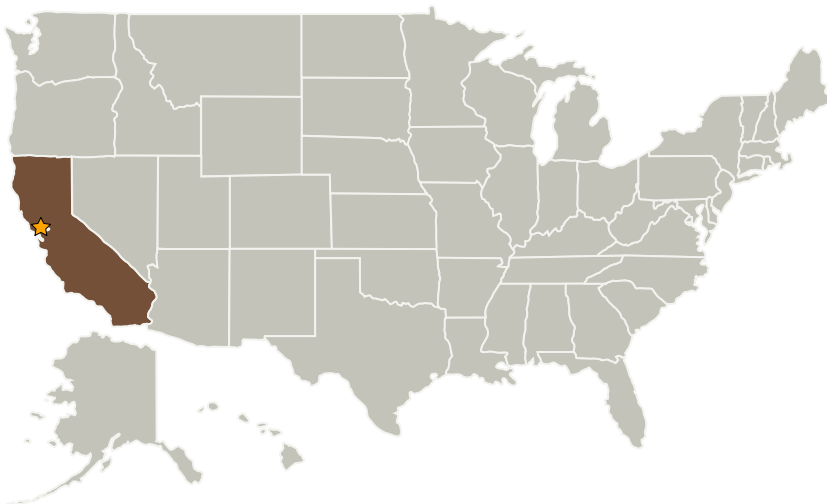# Virtual Satellite Integration Environment, Phase II

Completed Technology Project (2009 - 2011)

## Project Introduction

An integrated environment for rapid design studies of small satellite missions will be developed. This environment will be designed to streamline processes at the NASA Ames Mission Design Center. Several key concepts are introduced. The proposed environment introduces modern Product Data Management and Product Lifecycle Management (PDM/PLM) tools and processes to satellite mission design. Specifically, the notion of product structure, or bill of material (BOM), is expanded to a simulation BOM, or SBOM, with the capability to manage engineering analysis data, files and processes in the context of a product, in this case satellite mission. This approach constitutes a significant step beyond mere document management, which limits the traceability of which model of which analysis belongs to which version of the geometry or other analysis. It is a key enabler for model re-use. A Linked Model Environment (LME), i.e. an environment where all engineering analysis models are associatively linked, which was developed concurrently in the commercial aerospace and automotive industry, will extended to satellite mission design. This environment significantly reduces the amount of manual intervention engineers have to perform to translate information from one simulation tool to another. The concept of digital mockup (DMU), which typically addresses form and fit of components in an assembly, is expanded to include function, such that the inclusion of components in a satellite assembly that are functionally incompatible is rejected. Repetitive-iterative engineering tasks will be automated with the help of an integration framework tool which automates the execution of a sequence of codes and provides the capability to wrap drivers like optimizers or quality engineering tools around an automated analysis workflow.

## Primary U.S. Work Locations and Key Partners



Virtual Satellite Integration Environment, Phase II

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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Ames Research Center (ARC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/7853

| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ⭐Ames Research Center(ARC) | Lead Organization | NASA Center | Moffett Field, California |
| Advatech Pacific, Inc. | Supporting Organization | Industry Small Disadvantaged Business (SDB) | San Bernardino, California |

| Primary U.S. Work Locations |
|---|
| California |

## Project Transitions

▶ **March 2009:** Project Start

✔ **March 2011:** Closed out

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.5 Mission Architecture, Systems Analysis and Concept Development
    └ TX11.5.2 Tools and Methodologies for Performing Systems Analysis